FORM PTO-1390 DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 5-93)		ATTORNEY'S DOCKET NO. 340058.529USPC
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) Unknown 09/719289
INTERNATIONAL APPLICATION NO. **PCT/SE99/00963**	INTERNATIONAL FILING DATE **04 JUNE 1999 (04.06.1999)**	PRIORITY DATE CLAIMED **09 JUNE 1998 (09.06.1998)**

TITLE OF INVENTION
DEVICE AND METHOD FOR A HIGH PRESSURE PRESS

APPLICANT(S) FOR DO/EO/US
LÖNNEBORG, Nils-Gunnar

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is transmitted herewith (required only if not transmitted by the International bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 16 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

    IPER Containing Article 34 Amendments, Postcard, and check for filing fees.

    Applicant hereby claims priority from **Swedish** Application No. **9802069-6** filed **9 June 1998**.

EXPRESS MAIL MAILING LABEL

NUMBER **EL615484448US**

DATE OF DEPOSIT **9 December 2000**

I hereby certify that this paper or fee is being deposited with the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C F R 1 10 on the date indicated above and is addressed to Assistant Commissioner for Patents, Washington D C 20231-0001

Antoinette M. West

Signature

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/719289 Unknown	INTERNATIONAL APPLICATION NO. PCT/SE99/00963	ATTORNEY'S DOCKET NUMBER 340058.529USPC

17. ☒ The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO ..... $ 860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... $ 690.00

No international preliminary examination fee paid to USPTO (cu CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... $ 710.00

Neither international preliminary examination fee (37 CFR 1.482) nor International search fee (37 CFR 1.445(a)(2)) paid to USPTO $1000.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... $ 100.00

CALCULATIONS PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT				=	$1000.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).					$130.00	
Claims	Number Filed	Number Extra	Rate			
Total Claims	15 - 20 =	0	x $ 18.00		$.00	
Independent Claims	2 - 3 =	0	x $ 80.00		$.00	
Multiple dependent claim(s) (if applicable)			+ $270.00		$270.00	
TOTAL OF ABOVE CALCULATIONS				=	$1400.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (NOTE: 37 CFR 1.9, 1.27, 1.28)					$.00	
SUBTOTAL				=	$1400.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	$.00	
TOTAL NATIONAL FEE				=	$1400.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property)				+	$.00	
TOTAL FEES ENCLOSED				=	**$1400.00**	
					Amount to be refunded:	
					charged	

a. ☒ A check in the amount of $1400.00 cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. in the amount of $_ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **19-1090**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Eric J. Gash
NAME

46,274
REGISTRATION NUMBER

Device and method for a high pressure press

TECHNICAL AREA

The present invention relates to a device and method used in conjunction with high pressure presses in the areas of isostatic pressing and the high pressure treatment of substances. The present invention relates to a type of wear liner for use in high pressure presses and a method for fitting and replacing the wear liner.

BACKGROUND ART

For some time now high pressure treatment has been used as a method for inactivating micro-organisms and certain enzymes in foodstuffs and other provisions. A decisive factor for obtaining a good result from a high pressure treatment is that the pressure is sufficiently high. During treatment of provisions, the pressure is usually set at a pressure between 1,000 - 15,000 bar. Inside these presses that high working pressure is generated inside the innermost cylinder, the pressure chamber, also described as an inner liner. At such high pressures, the inner liner is subjected to very great fatigue stress. Liner failure unavoidably arises after some time in operation and so the inner liner is usually designed and made as a wear liner which is replaceable. To avoid liner failure, the wear liner is regularly replaced well in advance of the estimated service life. Such liners are expensive and consequently economically disadvantageous. Further, each wear liner replacement constitutes a time consuming and costly process. PCT/SE95/000153 describes a particular type of wear liner which is installed in a high pressure press of the pre-stressed wire-wound type.

Wear liners have to be replaced due to wear or fracture. The replacement operation includes a removal stage in which the wear liner is removed and an insertion stage in which a new wear liner is put in place. To remove a worn wear liner with, for example, a wire-wound press of the type described in PCT/SE95/000153 the piston part of the inner pressure intensifier of the press is arranged with specially adapted tools so that pressure can be brought to bear on the liner holder and the wear liner. Pressure from the inner pressure intensifier is applied to the liner holder and the wear liner and they are driven out of the cylindrical pressure chamber together under pressure. A new wear liner is placed in position inside a liner holder and driven into place inside the cylindrical pressure chamber of the press by the internal pressure intensifier which is combined with special tools. In the wire-wound press described in PCT/SE95/000153 both the interior of the cylindrical pressure chamber and the exterior of the liner holder are slightly conical in their cylindrical shape, shown schematically as prior art in Figure 1. The interior of the liner holder is cylindrical in shape. The wear liner is placed in the liner holder as a shrink fit. When the liner holder with the wear liner placed inside it is driven into the cylindrical pressure chamber of the press they become compressed and thereby pre-stressed in the radial direction in order to withstand high pressures under use.

As stated above, liner failure can arise after some time in operation. A feature of the wear liner described in PCT/SE95/000153 is that it is a very thin walled cylinder. This is designed such that in the event of a liner fracture, the additional force that might overload the press frame, which force is proportional to the cross section of the wear liner, is small. This means that the additional force due to the fracture can be safely confined within the press avoiding

expensive or dangerous damage to the press or its surroundings.

A further feature of the wear liner described in PCT/SE95/000153 is that it has a means on the outside of the wear liner, for example a spiral groove cut along the whole length of the outside surface of the wear liner. Thus if a wear liner should crack or split in service, then pressurised medium from the high pressure chamber leaks out of the wear liner. The pressurised medium that has leaked is conducted to the outside of the press via a groove or other means in the outer envelope surface of the wear liner. This indicates that a crack or split in the wear liner has occurred and that appropriate action must be taken and the wear liner replaced.

A disadvantage with the wear liner described in PCT/SE95/000153 is that it has to be mounted inside a wear liner holder, a cylinder with a conical exterior, which is expensive to manufacture. Its use is limited to presses with an internal pressure intensifier or a piston similarly capable of driving the wear liner in and out of the press. It is a lengthy and difficult process to remove the wear liner, as the wear liner and the liner holder have to be driven out of the press by the internal pressure intensifier combined together with special tools. The wear liner with the liner holder is also lengthy and difficult to install, as it has to be carefully driven into the press using the internal pressure intensifier together with special tools in order to position the conical liner holder, with the wear liner inside it, inside the cylindrical pressure chamber in a pre-stressed condition.

In addition to the wire-wound pre-stressed press of the type described in PCT/SE95/000153 there are alternate designs for high pressure presses. High pressure presses may or may not

have cylindrical pressure chambers that are pre-stressed. For example a sufficiently thick steel cylinder may be used as the cylindrical pressure chamber of a high pressure press without pre-stressing. However, this type of press requires frequent safety inspections for signs of damage when operated at higher pressures. Damage to such thick, heavy cylindrical pressure chambers entail expensive repairs or replacements.

DESCRIPTION OF THE INVENTION

It is an object of the invention to provide a high pressure press with a wear liner that is arranged in a state of residual radial compressive stress. It is a further object of the invention to provide a wear liner for a high pressure press that is easy to replace and is less expensive to manufacture. It is a still further object of the invention to manufacture a high pressure press that comprises a wear liner that may be easily removed.

These and other objects are achieved according to the invention by a replaceable wear liner with a slightly undersize outside diameter when compared to the inside diameter of a cylindrical pressure chamber. It is inserted into the cylindrical pressure chamber of a press without driving it in under the application of pressure. Once in position inside the cylindrical pressure chamber, it is fixed in place by expanding it radially under excess pressure. The wear liner is shaped as a thin walled circular cylinder which may be easily removed using a method described in the claims and below.

The wear liner is inserted into the cylindrical pressure chamber of the press. Once placed inside the cylindrical pressure chamber of a press the wear liner is fixed in place by the application of radial pressure to the inside of the

wear liner. This is carried out by closing the press and applying a pre-calculated excess radial pressure to the wear liner inside the press. This plastically deforms the wear liner leaving it with a residual compressive stress that acts as a radial pre-stress to withstand the high pressures generated in use.

To remove the wear liner according to the present invention the press is opened so that the wear liner may be accessed. A milling cutter or other tool is introduced inside the wear liner and used to make a series of longitudinal cuts inside the wear liner. The cuts are made to a pre-determined depth, running the whole length of the wear liner, deep in the wear liner material but without penetrating through the wear liner material and damaging the liner holder or innermost cylinder. The specially adapted milling cutter makes a cut which is approximately square in cross section. Although the cuts are preferably square in cross section it is within the scope of the invention to make cuts of a different cross-section.

Sufficient material is removed from the wear liner by the approximately square cuts that the remaining thin layer of wear liner material at the bottom of the cut is sufficiently wide that it acts as a kind of hinge. The thin layer or hinge buckles under the radial pre-stress compressive force remaining in the wear liner allowing the walls of the wear liner to collapse together.

When the cuts have been completed and the wear liner has collapsed inwards into the cuts it can then be removed easily from the liner holder or cylindrical pressure chamber without the use of pressure. After the old wear liner has been dismantled and removed a new wear liner can be put in place quickly and easily.

An economical high pressure press can comprise of a wear liner according to the invention. The press can have a relatively simple design as shown schematically in Figure 3. The cylindrical pressure chamber 3 may be manufactured as a cylinder from a single piece of solid steel. The cylindrical pressure chamber may alternatively be specially treated using, for example, an autofrettage process to provide a harder, stronger and radially pre-stressed region in the inner part of the cylinder. In such a one-piece cylinder design the wear liner may fit directly inside the cylindrical pressure chamber without any intermediate cylinder or wear liner holder.

A high pressure press comprising a replaceable wear liner according to the invention may be used for the treatment of substances, as in PCT/SE95/000153. Such a press may also be used for the isostatic pressing of powder pre-forms, to compact objects produced from powder or sintered forms. Such a press may also advantageously be used for consolidation of castings. Many castings contain internal cracks or other flaws following the casting process. Isostatic pressure treatment in such a press may be used to close up internal flaws thus consolidating the material of castings.

The advantages of this invention are many. The complete operation of changing the wear liner takes very little time and so may be planned with the minimum disruption to production requirements. The invention can be inserted, removed, and replaced in high pressure presses without the application of pressure to drive it in or out. The invention does not require an internal pressure intensifier or other piston with or without special tools to drive it in or drive it out of the press. This is simpler, quicker and removes the risk of accidental damage due to the inaccurate or wrong application of pressure by mistake. The invention is less expensive to manufacture in the embodiment of a regular

circular cylindrical form, compared to the cost of making pressure cylinders with conical bores and wear liner holders with conical outer diameters.

The invention can be incorporated in other types of high pressure presses, in addition to the type of press described in PCT/SE95/000153. The present invention may be used in high pressure presses designed with or without pre-stressed cylindrical pressure chambers, presses with or without an internal pressure intensifier, and presses with wire-wound cylindrical pressure chambers or presses with solid cylindrical pressure chambers. Because the present invention is so widely applicable it is expected to be manufactured in relatively greater numbers with the implicit cost reduction that that involves.

The present invention enables high pressure presses to be operated at a higher pressure within their respective design pressure. The use of a wear liner with the features disclosed in PCT/SE95/000153 means that close safety inspections of a pressure cylinder are not required so frequently since the wear liner is both easily changed and also indicates when damage or wear has taken place, as also described below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described in more detail in connection with the enclosed drawings.

Figure 1 shows the prior art schematically with a wear liner and a wear liner holder of a high pressure press.

Figure 2 shows schematically a wear liner according to the invention being inserted into the cylindrical pressure chamber of a high pressure press.

Figure 3 shows a wear liner according to the invention being expanded and radially pre-stressed inside the cylindrical pressure chamber of a high pressure press.

Figure 4 shows a wear liner according to the invention in position in the cylindrical pressure chamber of a high pressure press.

Figure 5 shows cuts being made inside a wear liner according to the present invention prior to removing it from a high pressure press.

Figure 6 shows a dismantled wear liner according to the present invention being removed from a high pressure press.

DESCRIPTION OF EMBODIMENTS

A replaceable wear liner according to the present invention is shaped as thin-walled circular cylinder, although other cylindrical shapes are within the scope of the invention. The outside diameter of a wear liner according to the present invention is slightly undersize compared to the inside diameter of the a cylindrical pressure chamber or liner holder of a high pressure press.

The wear liner 1 shown in Figure 2 is inserted in the cylindrical pressure chamber 2. Once placed inside the cylindrical pressure chamber 2 the wear liner is fixed in place by the application of an excess radial pressure. This is carried out by closing the press and applying a pre-calculated excess pressure to the wear liner inside the press, as shown schematically by letter "P" in Figure 3. This plastically deforms the wear liner leaving it with a residual compressive stress that acts as a radial pre-stress against the high pressures generated in use inside the press.

The wear liner 1 is put in place inside the cylindrical pressure chamber 2 inside the press. Two end caps 5, 6 are placed in position at either end of the wear liner. The end caps 5, 6 are each equipped with a temporary sealing means in the form of temporary undersize end cap seals 7, 8 which fit inside the ends of the wear liner 1. The inside diameter of the wear liner is undersize when first fitted, which means that the end cap seals 7, 8 have to be of a slightly smaller diameter than seals for normal service. When the end caps 5, 6 have been positioned, pressure may be applied inside the wear liner, by means of fluid under pressure supplied by an external pressure source delivered by means such as a pipe (not shown) arranged to pass through an end cap 5, 6.

Under sufficient excess pressure, above the yield point of the material, the wear liner is deformed and permanently expanded to a pre-calculated degree. The pressure is released. The end caps 5, 6 are removed. The end parts of the wear liner that were adjacent to the end caps and which were not under pressure may have a smaller inside diameter than the main part of the wear liner which was exposed to pressure. When necessary, the inner surface of the undeformed regions of the wear liner adjacent to the end caps may be machined to increase the inside diameter so that it is the same as the rest of the wear liner. The machining can be done before or after the expansion of the wear liner.

A wear liner according to the invention may be removed, either because of a crack or a fracture failure or as part of a planned maintenance operation, as follows.

One or both end caps 5, 6 with seals 7, 8 of the high pressure press are removed, depending on the type of press. A milling cutter 9 or other type of cutting, milling or grinding tool is

arranged to be lowered into the wear liner 1 as shown in Figure 5.

The milling cutter 9 is operated so as to make a series of longitudinal cuts 10 running the whole length of the liner. Usually four cuts distributed approximately evenly around the circumference provide sufficient effect. Fewer or more cuts may be used depending on the diameter of the wear liner. The cuts are made to a pre-determined depth, as deep as possible in the wear liner material, leaving a thickness of between 1-10% and preferably between 1-5% of the diameter of the wear liner diameter in place.

After the cuts have been made and the specially adapted milling cutter removed the collapsed wear liner 11 can then be removed quite easily from the cylindrical pressure chamber 2 and lifted clear with a standard lifting apparatus as shown in Figure 6. After the old wear liner has been dismantled and removed a new wear liner can be quickly and easily put in place as described above.

CLAIMS

1. A method to provide a high pressure press comprising a cylindrical pressure chamber (2) and a replaceable wear liner (1), **characterised** by the steps of
-inserting said wear liner (1) into said cylindrical pressure chamber (2)
-fixing said wear liner (1) in place with expansion by inner pressure above the yield point, such that said wear liner (1) is thereby arranged in a state of residual compressive stress by the increase in diameter of said wear liner (1).

2. A method according to claim 1, **characterised** by closing the press and applying an inner fluid pressure to said wear liner (1) inside the press, so as to provide said residual compressive stress.

3. A method according to claim 2, **characterised** by said inner fluid being supplied by an external pressure source connected to the press.

4. A method according to any one of claims 1-3, **characterised** in that said wear liner (1) is plastically deformed, so as to provide said residual compressive stress.

5. A method according to any one of claims 1-4, **characterised** in that the method further comprises the step of removing an existing wear liner (1) which replacement includes the steps of
-making one or more cuts in the inner surface of the existing said wear liner (1) with the intention of causing the existing said wear liner (1) to collapse under the residual compressive stress,

-removing the collapsed existing said wear liner (1).

6. A method according to claim 5, **characterised** in that the one or more cuts (10) which are made in the inner surface of the existing said wear liner (1) are approximately square in cross section.

7. A high pressure press comprising a cylindrical pressure chamber (2) and a replaceable wear liner (1) arranged inside the cylindrical pressure chamber (2) in a state of residual compressive stress, **characterised** in that the exterior surface of said wear liner (1) is in direct contact with the interior surface of said cylindrical pressure chamber (2).

8. A high pressure press according to claim 7, **characterised** in that the wear liner (1) is shaped as a thin walled, circular cylinder.

9. A high pressure press according to any one of claims 7-8, **characterised** in that the wear liner (1) is plastically deformed, as a result of an expansion of the wear liner after its insertion into the pressure chamber (2), so that a residual compressive stress is provided.

10. The use of a high pressure press according to any one of claims 7-9 for the treatment of substances.

11. The use of a high pressure press according to any one of claims 7-9 for the isostatic pressing of powder pre-form products.

12. The use of a high pressure press according to any one of claims 7-9 for the isostatic pressing of castings.

Fig. 1

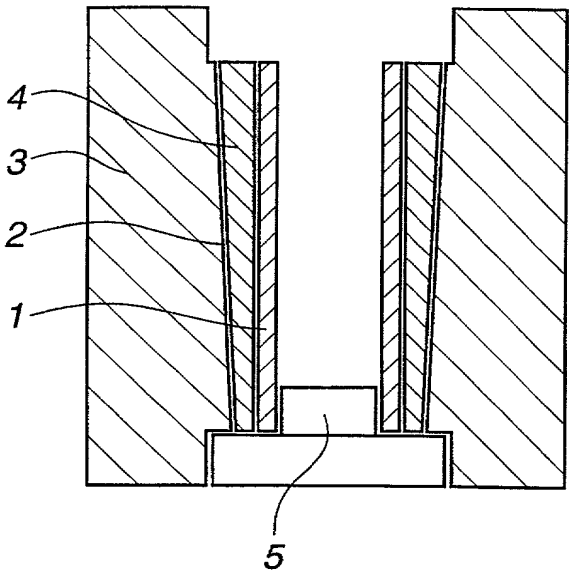


Fig. 2

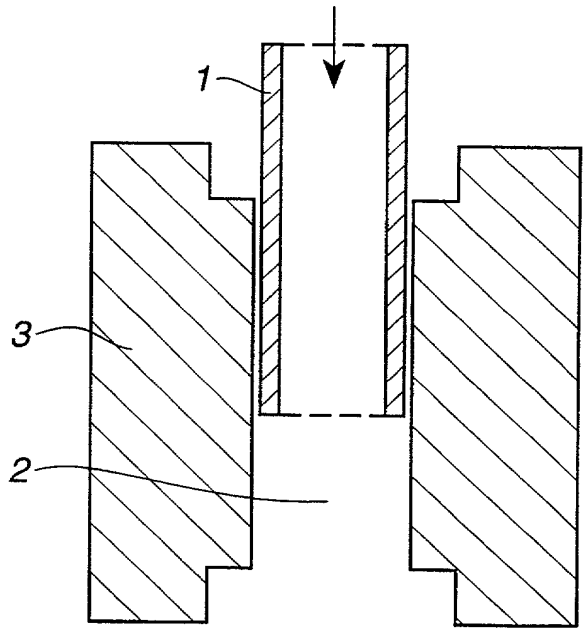


Fig. 3

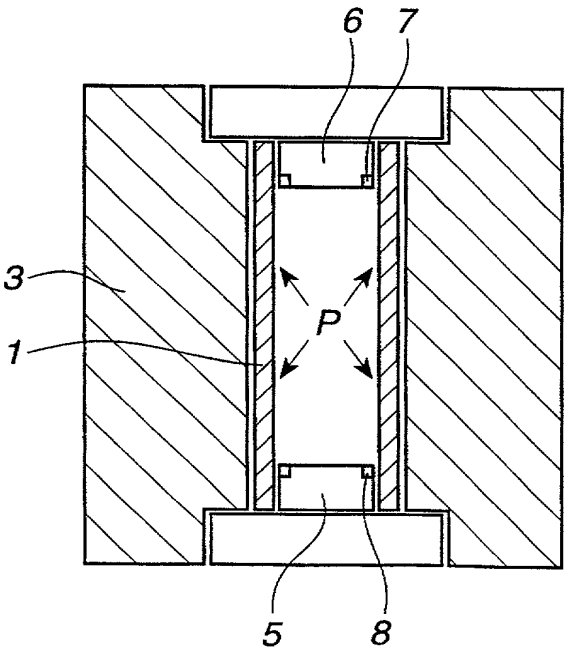


Fig. 4

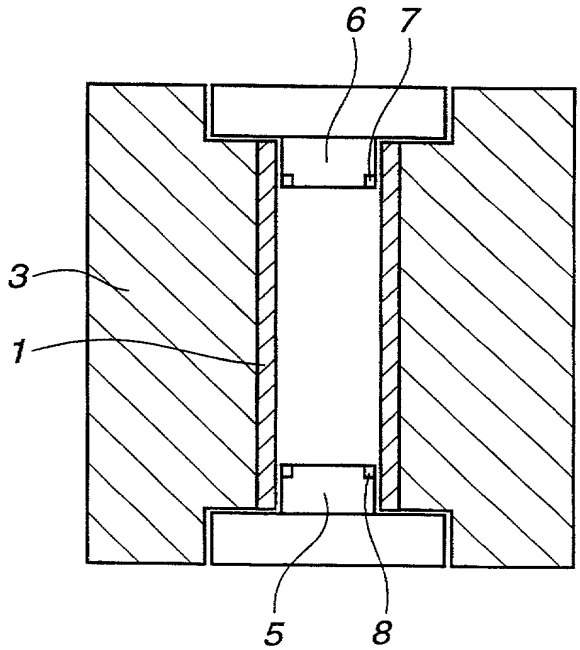


Fig. 5

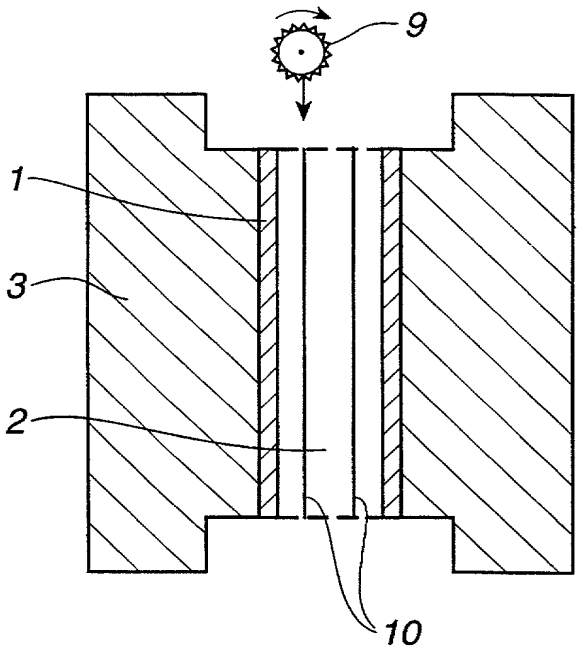
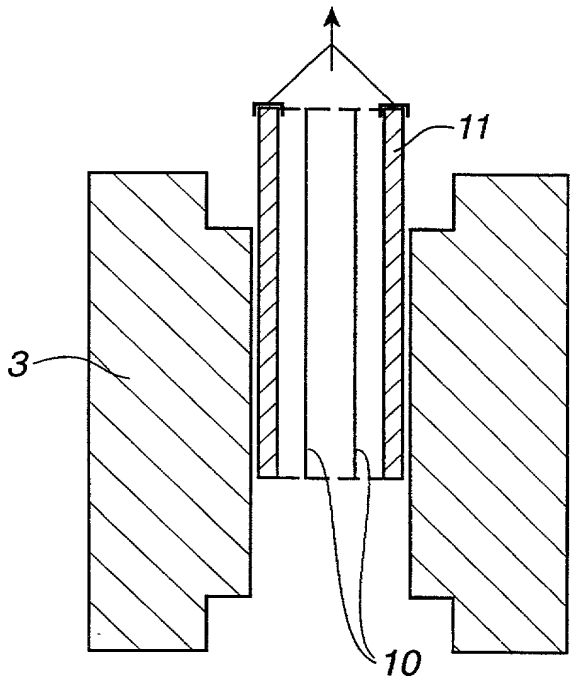


Fig. 6



DECLARATION AND POWER OF ATTORNEY

As the below-named inventor, I declare that:

My residence, post office address, and citizenship are as stated below under my name.

I believe I am the original, first, and sole inventor of the invention entitled "DEVICE AND METHOD FOR A HIGH PRESSURE PRESS," which is described and claimed in the specification and claims of International Patent Application No. PCT/SE99/00963, which was filed on 4 June 1999 and for which a patent is sought.

I have reviewed and understand the contents of the above-identified specification and claims, as amended by any amendment specifically referred to herein (if any). I acknowledge my duty to disclose information of which I am aware which is material to the patentability and examination of this application in accordance with 37 C.F.R. § 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. § 119 of the foreign patent application listed below:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:			
COUNTRY	APPLICATION NUMBER	DATE OF FILING	PRIORITY CLAIMED UNDER 35 USC 119
Sweden	9802069-6	9 June 1998	Yes

I hereby appoint Richard W. Seed, Reg. No. 16,557; Robert J. Baynham, Reg. No. 22,846; George C. Rondeau, Jr., Reg. No. 28,893; David H. Deits, Reg. No. 28,066; William O. Ferron, Jr., Reg. No. 30,633; David J. Maki, Reg. No. 31,392; Richard G. Sharkey, Reg. No. 32,629; David V. Carlson, Reg. No. 31,153; Karl R. Hermanns, Reg. No. 33,507; David D. McMasters, Reg. No. 33,963; Michael J. Donohue, Reg. No. 35,859; Jane E. R. Potter, Reg. No. 33,332; Robert Iannucci, Reg. No. 33,514, Lorraine Linford, Reg. No. 35,939; David W. Parker, Reg. No. 37,414; E. Russell Tarleton, Reg. No. 31,800; Ellen M. Bierman, Reg. No. 38,079; Brian G. Bodine, Reg. No. 40,520; Robert M. Ward, Reg. No. 26,517; Kevin S. Costanza, Reg. No. 37,801; Thomas E. Loop, Reg. No. 42,810; Stephen J. Rosenman, Reg. No. 43,058; Brian L. Johnson, Reg. No. 40,033; Susan D. Betcher, Reg. No. 43,498; William T. Christiansen, Reg. No. 44,614, Gary M. Myles, Reg. No. 46,209; Eric J. Gash, Reg. No. 46,274; Jeffrey C. Pepe, Reg. No. 46,985, and Charles J. Rupnick, Reg. No. 43,068, comprising the firm of Seed Intellectual Property Law Group PLLC, 701 Fifth Avenue,

Suite 6300, Seattle, Washington 98104-7092, as my attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. Please direct all telephone calls to **Eric J. Gash** at (206) 622-4900 and telecopies to (206) 682-6031.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Nils-Gunnar Lönneborg

Date JAN 12, 2001

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